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(71) Applicant

Francisco Casau Rodríguez  
Gavilan 2, 28500 Madrid, Spain

(72) Inventor

Francisco Casau Rodríguez

(74) Agent and/or Address for Service

David Kettle Associates  
Audrey House, Ely Place, London, EC1N 6SN,  
United Kingdom

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(56) Documents cited

GB 2219535 A GB 2140248 A WO 91/18456 A1

WO 91/13497 A1 US 5060272 A US 4187544 A

Music Technology, November 1991, pages 30 to 35

Music Technology, August 1991, pages 84 to 87

(58) Field of search

UK CL (Edition K) H4J JGP JGX, H4R RSX

INT CL<sup>5</sup> H04H 7/00, H04R 3/00 5/04

(54) Computer-controlled audio mixing console

(57) This system allows a mixing console to be operated by manipulation of graphical icons on a display screen. The icons represent the regulation and control elements of the console e.g. faders, and may be manipulated by the user with a mouse.

Analog cards with audio inputs and outputs controlled by the computer allow the elimination of conventional potentiometers and other control components.

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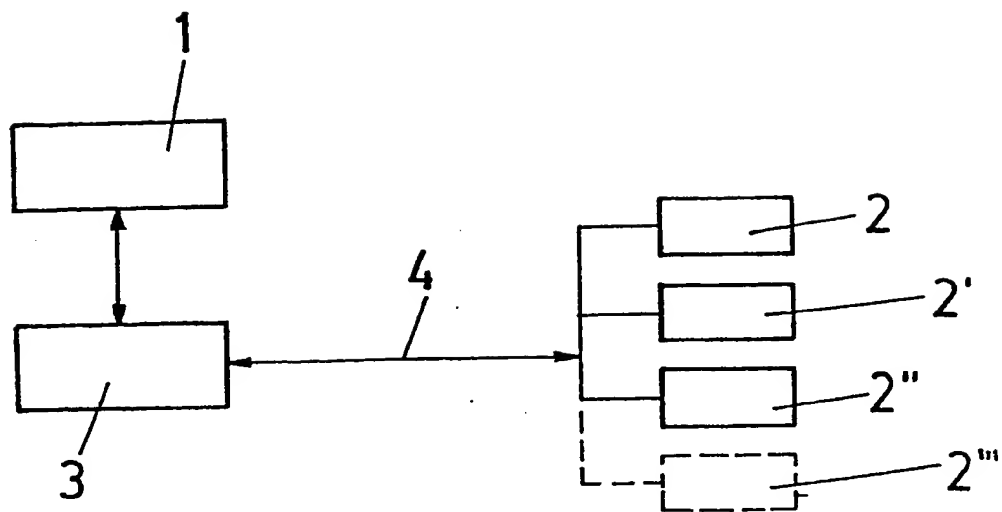


FIG.1

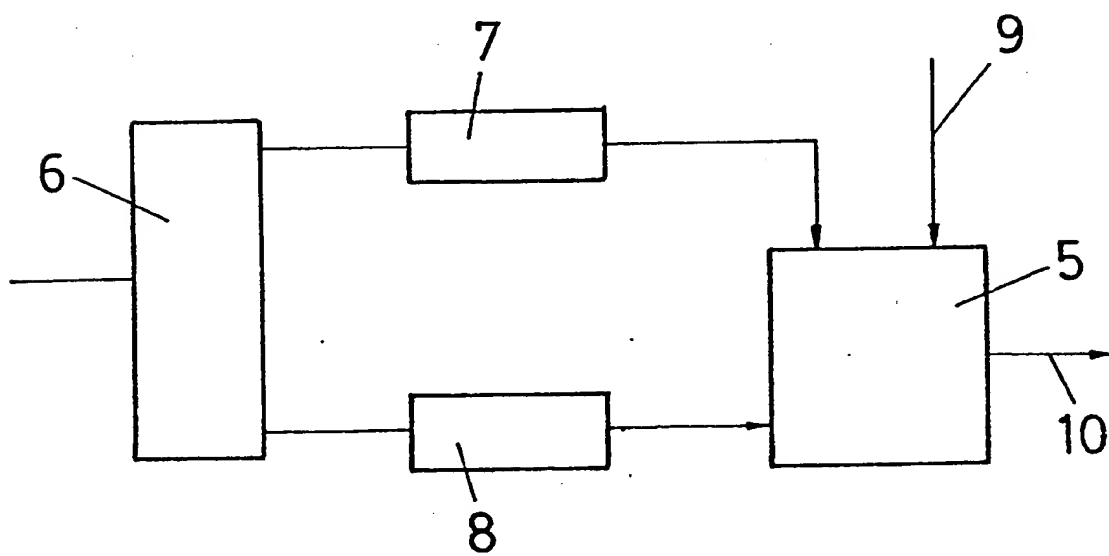


FIG.2

A COMPUTER-CONTROLLED MIXING CONSOLE SYSTEMDESCRIPTION5      SUBJECT OF THE INVENTION

As set out in the heading to this description, this invention refers to a computer-controlled mixing console system intended to control a set of sounds in a reduced space, namely a computer screen, by graphic representation of the regulation and control components.

BACKGROUND TO THE INVENTION

15            A mixing console is made up, among other things, of a series of inputs which, by means of regulatory elements, provides each one of said inputs individually, at the output, with a different signal level, or a combination thereof. Usually, potentiometers are used to alter the input signal level, and operation is manual.

Mixing consoles grow in size with the number of input signals, as each regulatory element occupies a given space on it, and space must also be added to operate each element individually without affecting those adjacent to it.

Another drawback is that equipment of such characteristics has to be operated by specialized personnel, not only because of its complexity but also because of additional factors which may arise during the mixing process (feedback, coupling, etc) which must be solved during operation.

DESCRIPTION OF THE INVENTION

35            The problems raised by a conventional mixing console are resolved by the computer-controlled system put forward

in the invention. This is a system which replaces and adds further features to existing analog systems for the processing and controlling of all the audio sources which may be used in live performances and in recording studies, television, radio, public address, etc.

The systems consists of the functional coupling of a standard computer system, of the sort available on existing or future markets, irrespective of basic features such as keyboard, monitor, mouse, peripherals or operative system, because the program which runs the operations is written in a high-level language which can be compiled for any operative system format, plus a system of digital electronic circuits which control analog audio circuits that are responsible for the whole process of transforming the audio signals, including mixing of equalization levels, insertion of other signals, addition of special effects, control of all types of audio equipment for production of tonal, timbral, frequency or any other type of changes.

The computer system consist of a CPU and RAM memory banks for the storage of transitory system data, an external disc for the permanent storage of those data, a memory control operative system and CPU, a permanent power supply, a high-resolution graphics card, a mouse for entering texts and controlling the computer system data, and a monitor screen displaying the system processes by moving the mouse cursor on the screen, with a colour graphic simulating all the mechanical elements incorporated into the analog mixing consoles currently available on the market, e.g. sliding potentiometers, control keys, data parameter displays, control buttons, etc.

This computer system interacts with a card to which all the analog input signals are sent, whose outputs (mixing console outputs) are set up in a given state by data

supplied directly by the computer or through the computer by the system operator: the operator now no longer needs to be a specialist, since controls such as saturation of amplification components, feedback, etc. are taken account of in the data made available to the computer.

This system has all the advantages inherent to computer control. It makes it possible to reproduce a standard mixing console on a screen without need of manual controls, so reducing the size of the equipment to a minimum.

#### DESCRIPTION OF THE DRAWINGS

To complete this description and to aid in a better understanding of the features of the invention, these Specifications are accompanied by a set of drawings, forming an integral part hereof which, by way of illustration and without limitation, show the following:

Figure 1 is a block diagram of the computer-controlled mixing console system which is the subject of the invention.

Figure 2 is a block diagram of that part of the system controlled by the computer system.

#### A PREFERENTIAL DESIGN OF THE INVENTION

The figures show that the data-processing part of the computer-controlled mixing console system put forward in the invention incorporates a CPU (1) which transmits data to a series of modules (2), (2') ... (2'') through a data coding card (3) and a general data output bus (4).

The data supplied by the CPU (1) are transmitted to an analog card (5) through a decoding card (6) which is

divided into two sections, one for addresses (7) and the other for data (8).

5 It is on this analog card (5) where the input channel(s) is/are regulated and/or mixed to supply the audio outputs (10) according to the data in the computer system or additional data provided by external operation.

10 It is not thought necessary to further extend this description in order for any expert in the field to grasp the scope of the invention and the benefits arising from it.

15 The materials, shape, size and arrangement of the elements may be varied provided that this does not involve an alteration to the essential nature of the invention.

The terms of these Specifications are to be taken in all cases broadly and without limitation.

CLAIMS

1. A mixing console system comprising at least one analog audio circuit under the digital control of a computer.

2. A mixing console system according to claim 1, wherein the CPU of the computer is connected to the analog audio circuit for data transmission thereto via coding means, a data bus, and decoding means, the analog audio circuit being arranged to produce an audio output signal modified from an audio input signal in accordance with data transmitted from the CPU.

3. A mixing console system according to claim 1 or claim 2, wherein the computer is capable of stand-alone operation.

4. A mixing console system according to any preceding claim, wherein the computer includes display means and is programmed to display simulated mechanical control elements on the display means.

5. A mixing console system according to claim 4, wherein the mechanical control elements that are simulated are typical of a standard mixing console, including sliding potentiometers, control keys, data parameter displays and control buttons.

6. A mixing console system according to claim 4 or claim 5, and including input means allowing a user to interact with the simulated mechanical control elements, thereby to control the system.

7. A mixing console system according to claim 6, wherein the input means is a mouse controlling the movement of a cursor around the simulated mechanical control elements.

8. A method whereby a user can operate a mixing console system, wherein a graphical representation of regulation and control elements is displayed on display means and the user interacts with the displayed representation to control the system.

9. A mixing console system, substantially as hereinbefore described or with reference to one or both of the accompanying drawings.

10. A computer-controlled mixing console system designed to control a set of sounds in a limited space, namely a computer screen, by the graphic representation of the regulation and control elements wherein, essentially, there is a CPU and a series of modules to which the CPU transmits information through a data coding card and a general data bus, said modules having a decoder and an analog card with audio inputs and outputs where the signal depends on the data supply to the module by the CPU.

11. A computer-controlled mixing console system according to claim 10, wherein the CPU and associated elements form part of a standard computer system functionally coupled to an analog card or a set of such cards, by digitally controlling the analog system, with the particular feature that such control takes place by means of the computer system screen, without manual controls.



**Patents Act 1977**  
**Examiner's report to the Comptroller under**  
**Section 17 (The Search Report)**

Application number

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**Relevant Technical fields**

- (i) UK CI (Edition K ) H4J (JGP, JGX) H4R (RSX)
- (ii) Int CI (Edition 5 ) H04H 7/00 H04R 3/00, 5/04

**Search Examiner**

P J EASTERFIELD

**Databases (see over)**

- (i) UK Patent Office

**Date of Search**

8 SEPTEMBER 1992

Documents considered relevant following a search in respect of claims

1-11

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2219535 A (OPTICAL TECHNIQUES) Especially page 18 line 17 to page 19 line 8	1-6, 8, 10, 11
X	GB 2140248 A (SAINDOUT) Whole document	1
X	WO 91/18456 A1 (ARTEMIS) Especially page 9 lines 11-14	1
X	WO 91/13497 A1 (VOYAGER SOUND) Whole document	1-8, 10, 11
X	US 5060272 A (SUZUKI) Whole document	1
X	Music Technology, November 1991, pages 30-35 Vic Lennard, "75", especially page 34 "75 console"	1-8, 10, 11
X	Music Technology, August 1991, pages 84-87 Ian Waugh, "Tentrax"	1-8, 10, 11
X	US 4187544 A (LARNER) Whole document	1-3

Category	Identity of document and relevant passages	Relevant to claim(s)

#### Categories of documents

**X:** Document indicating lack of novelty or of inventive step.

**Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category.

**A:** Document indicating technological background and/or state of the art.

**P:** Document published on or after the declared priority date but before the filing date of the present application.

**E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.

**&:** Member of the same patent family, corresponding document.

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